

## Department of Chemistry & Physics

CHEM 1080. INTRODUCTORY BIOCHEMISTRY. (3-3-0). Chemistry of carbohydrates, lipids and proteins; major metabolic pathways. Prerequisite: registration in or credit for 1091; credit for 1070.

**Text** Fundamentals of General, Organic, and Biological Chemistry, 6<sup>th</sup> ed customized for NSU, by J. McMurry, M. E. Castellion and D. S. Ballantine, Pearson Custom Publishing (2010) and General, Organic and Biological Chemistry, A Guided Inquiry, by Michael P. Garoutte

### Course Content

1. Alkenes, Alkynes and Aromatics
  - a. Structure, properties, nomenclature, reactions
2. Alcohols, Phenols, Thiols, and Ethers
  - a. Structure, properties, nomenclature, reactions
3. Aldehydes and Ketones
  - a. Structure, properties, nomenclature, reactions
4. Carboxylic Acids and Their Derivatives
  - a. Structure, properties, nomenclature, reactions
5. Amines and Amides
  - a. Structure, properties, nomenclature, reactions
6. Carbohydrates
  - a. Types of Carbohydrates
  - b. Stereoisomers and Stereochemistry
  - c. Mono-, di-, and polysaccharide functions
7. Lipids and Their Function in Biochemical Systems
  - a. Fatty acids, glycerides, nonglyceride lipids
  - b. Complex lipids, biological membrane structure
8. Protein Structure and Function
  - a. Amino acids, use in formation of proteins
  - b. Structure and function of proteins
- c. Myoglobin and hemoglobin
- d. Protein denaturation, and digestion
9. Enzymes
  - a. Nomenclature, classification
  - b. Effect on activation energy, reactions
  - c. Cofactors & coenzymes, environmental effects
  - d. Enzyme activity regulation and inhibition
  - e. Proteolytic enzymes, uses in medicine
10. Carbohydrate Metabolism
  - a. Cellular energy, catabolic processes
  - b. Glycolysis, fermentations, pathways
  - c. Glucogenesis, glycogen synthesis, degradation
11. Aerobic Respiration and Energy Production
  - a. Mitochondria, aerobic respiration
  - b. Citric acid cycle, oxidative phosphorylation
  - c. Amino acid degradation, urea cycle, anabolism
12. Fatty Acid Metabolism
  - a. Lipid metabolism, regulation
  - b. Fatty acid degradation, oxidation, synthesis
  - c. Insulin and glucagons effects on metabolism

### Course Goals:

This course is intended:

1. To introduce the student to the structure and function of the major types of molecules found in all living organisms.
2. To encourage the student to relate abstract information to actual chemical events in the living organism.
3. To prepare nursing students for the chemical portion of a standardized nursing examination for entry into the clinical portion of their training.
4. To prepare the nursing student to better understand the clinical experience.

### Course Objectives:

The student who successfully completes this course should be able:

1. To recognize carbohydrates, lipids, and amino acids and draw representative structures of each.
2. To explain the physical and chemical properties of each type of biomolecule.
3. To predict products for selected chemical reactions involving each type of molecule.
4. To understand catalysis and the role of enzymes in this process.
5. To answer questions about the three major metabolic pathways common to living organisms.
6. To realize the importance of structure/function relationships in macromolecules.

### Students with Disabilities:

*It is the policy of NSU to accommodate students with disabilities, pursuant to federal law, state law, and the University's commitment to equal educational opportunities. Any student with a disability who needs accommodation, for example in seating placement or in arrangements for examinations, should inform the instructor at the beginning of the course. Students with disabilities are encouraged to contact Disability Services, which is located in Kyser Hall, room 237, telephone 357-6950 or (TTD) 357-4393 or [disability@nsula.edu](mailto:disability@nsula.edu).*